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On the Reptiles and Batrachians of Grand Cayman. By Samuel Garman, Cambridge, Mass.

(Read before the American Philosophical Society, October 7, 1887.)

Grand Cayman island is situated in the Caribbean sea, south of Cuba—in round numbers—about two hundred miles, west north-west of Jamaica about the same distance, and not far from four hundred miles east of Yucatan. It is a comparatively recent coral formation and rises but little above the sea. In total length it approaches twenty-five miles, but in width it is less than three.

Consideration of the origin, size and position of Grand Cayman, together with the directions of its currents, winds and traffic, prepares us for the conclusion, reached from study of a portion of its terrestrial fauna, that it has received its land animals, not so very long ago, from the neighboring large islands.

The collection on which this notice is based, purchased by the Museum of Comparative Zoölogy, from Mr. W. B. Richardson, contained one hundred and five specimens, representing in all six species: three lizards, one snake, one toad and one treefrog. One of the lizards, a little *Anolis*, is nearly related to a species from Jamaica; another, a *Gecco*, belongs to a Jamaican species, and is hardly distinct enough to rank as a variety; and the third forms a species nearest to one described by Professor Cope from Navassa (eastward from Jamaica) and close to another from Cuba. The snake and the treefrog belong to Cuban species. And the toad ranges from Jamaica to Brazil. There might be more hesitation in calling one of the forms distinct if it were not for its complete isolation. It is because of this, and, also, because of the likelihood that the differences are becoming greater and more numerous with time, that the details of description are so much dwelt upon. Besides, the closeness of the affinities, with forms belonging to the other islands, makes it the more necessary to deal with particulars.

The list includes the following:

Anolis conspersus, sp. n.

Liocephalus varius, sp. n.

Aristelliger præsignis Hallow.; Cope.

Alsophis caymanus, var. n.

Bufo marinus Linn.; Schneid.

Hyla septentrionalis Tschudi.; Blgr.

ANOLIS CONSPERSUS, sp. n.

Head large, about one and three-fourths times as long as broad, longer than the tibia. Forehead concave. Frontal ridges low. Occiput concave. Scales on the sides and top of the head with low blunt keels.

Scales of the supraorbital semicircles enlarged, separated mesially by a single series of scales. Ten to fifteen enlarged keeled supraocular scales, the largest of which is separated from the supraorbitals by a single series of granules. Occipital small, about the size of the ear-opening, separated from the supraorbitals by three or four series of scales. Canthus rostralis sharp, prominent; canthal scales four. Loreal rows five. Six labials to below the centre of the eye. Ear-opening small, vertical diameter much the greater. Gular appendage rather large, the fold reaching as far backward as the axil, less developed in the female. Gular scales flat, with faint indication of an obtuse keel. Body not compressed; a slight nuchal fold in the male; no dorsal fold. Dorsal scales small, granular, smooth or obtusely keeled, a little larger in several of the vertebral rows; ventral scales larger. Limbs moderate; the adpressed hind leg reaches the orbit; digital expansions moderate; lamellæ under phalanges ii and iii of the fourth toe twenty-four. Tail twice as long as head and body, compressed, less in female, edged above with a series of strongly keeled scales. Male with enlarged postanal scales.

Adults yellowish-green to olivaceous, thickly sprinkled with small spots of light color, reddish or brownish in life; tail more uniform; belly bluish, presenting a clouded appearance toward flanks and chin. Goitre blue or purple.

Very young ones are light ashly or grayish on the back, white beneath; somewhat clouded with darker on flanks, limbs, chin and throat. The light spots or freckles first appear on the top and sides of the head, thence gradually spreading backward. Above the pelvis on the back there is a band of light color which narrowing backward extends to the middle of the tail, where it fades. On one specimen there is a small dark blotch at each side of the pelvic band; on the middle of the body there is a small transverse hour-glass-shaped blotch with a smaller rounded spot of white at each side of it on the mesial line; it has a similar mark above the axils, and a dark spot on the occipital shield. On many individuals, old and young, the forehead and cheeks are brown.

This species is closely allied to *A. grahami* as accepted by Dr. Boulenger, whose form of description we have followed, more or less nearly, to facilitate comparisons. *A. conspersus* has a much smaller occipital scale, its canthal and frontal ridges are sharper, it has a single series between the supraorbitals on the crown; it has not the lilac color on tail and limbs, and its goitre is dark blue or purple, instead of crimson with yellow or white margin.

LIOCEPHALUS VARIUS, sp. n.

Upper head-scales large, smooth or faintly striate; nasal in contact with the rostral; supraorbitals in contact on the median line; supraoculars six to eight, the majority of which are separated from the supraorbitals by a single series of small scales. Parietals two pairs in one row, the outer of each pair being nearly twice the size of the inner; the inner

elongate, narrow, twice as long as broad, separated on the mesial line by the interparietal and, in cases, by a small scale behind it. In front of the interparietal there is a pair of small shields, and in front of them one or more small ones. The number of plates between the supraoculars and interparietal varies from three to five. Two pairs of the supraorbitals are in contact across the forehead behind the frontal. Three cross-rows of plates behind the internasals. Frontal medium, hexangular. A pair of larger prefrontals, in front of which there is a second pair of smaller ones, the two pairs being sometimes separated at their inner angles by a small lozenge-shaped plate. Internasals elongate, narrow, with the acute posterior extremity directed obliquely outward. Auricular scales two to three, broad, upper largest. Scales in front of ear moderately large, smooth. On the sides of the neck the skin is strongly folded, covered with keeled small scales. Dorsal crest low. Dorsal scales mucronate, the keels obliquely turned toward the vertebral line. The scales of the flank are smaller and rather abruptly turned upward. The ventrals are about as large as the dorsals, smooth, broader than long, and rounded on posterior margin. There are forty-one to forty-three rows of scales, counting around the middle of the body. The adpressed hind limb does not reach the eye. Tail feebly compressed, more than one and one-half times as long as the body, with a crest a little stronger than that of the back.

Olive brown, with a metallic lustre, clouded with dark brown, which in earlier stages was apparently arranged in transverse bands. Faint indications of a light band on the upper edge of each flank. Olivaceous beneath, lighter backward and sprinkled or clouded with many small spots of white. Tail ringed with brown, about seventeen rings. Chin and throat clouded or reticulated with olive and white. A light band from the hinder angle of the eye to the angle of the mouth. Lighter scales sprinkled over the body and limbs, both above and beneath.

This species is allied to *L. eremitus* Cope from Navassa, and with it to *L. carinatus* of Cuba and the Bahamas, more than to the others. The distinguishing characters appear in the scales of the head, in the relative sizes of those of the body, and in the coloration.

ARISTELLIGER PRÆSIGNIS Hallowell ; Cope.

Total length of the largest specimen six and a half inches ; snout to vent two and a half.

Half-grown examples are grayish-brown to brownish-gray, white beneath. The top of the head is nearly uniform brown. From each nostril through the eye to the shoulder there is a lighter edged brown band ; these bands converge in approaching the shoulders. From the shoulders backward there are brownish darker edged blotches, each of which presents an angle toward the vertebræ, thus enclosing lozenge-shaped lighter spots on the median line. On the sides of the tail these lateral blotches alternate, or, meeting, form transverse bands of brown. Labials brown, with or without whitish spots. Chin mottled with brownish. The color

is darker on the largest specimen ; the light spots of the back continue beyond the base of the tail ; but anteriorly the ground color has become so dark that the spots and bands are obscured.

Hallowell's specimens, from Jamaica, were "uniform brown above with no lines or spots." The circular pupil and the clawless thumb were probably oversights. Such measurements as he gives would make his types smaller than the largest described above. Dr. Boulenger's description, also taken from Jamaican specimens, answers much better to those from Grand Cayman.

ALSOPHIS CAYMANUS.

A. angulifer Bibr.; Cope, var. n.

Body moderate, blunt-angled at the edge of the abdomen ; head distinct, narrowed in front, subquadrate in transverse section, flattened on the crown ; tail nearly one-third of the total length, slender. Eye moderate. Teeth small, longer and farther apart backward. Scales with two pores, smooth, in seventeen rows ; dorsal longer than broad, outer and caudal as broad as long. Ventrals broad ; in five specimens they number 167, 170, 171, 173, and 175 respectively. Anal bifid. Subcaudals in two series ; in three specimens there are 125, 127, and 129 pairs. Crown-shields nine ; internasals moderate, narrower forward ; prefrontals broader than long, bent downward, and shortened, at the loreal ; frontal about twice as long as broad, truncate in front, narrower and having parallel sides behind the middle, acute-angled between the parietals ; supraoculars large, broad posteriorly ; parietals very large, outer anterior angle in contact with the lower postorbital. Rostral medium, hardly reaching the top of the snout, in contact with six plates. Nostril between the quadrate halves of the small nasal. Loreal small, quadrangular, hinder lower angle acute. One anteorbital, reaching the top of the head, not in contact with the frontal. Two postorbitals ; lower in contact with the fifth and sixth labials and the temporal ; upper meeting the supraocular and the parietal. Temporal large, narrow anteriorly, bounded by the lower postorbital, the posterior three labials, and two post-temporals. Of the latter the upper is the larger. Labials eight, third, fourth and fifth in orbit, sixth and seventh very large. Lower labials ten, first pair meeting behind the mental, first six in contact with the submentals, fifth and sixth largest. Mental small, triangular. Submentals two pairs, posterior much longer, each of the anterior meeting five, and each of the posterior meeting two of the lower labials.

Large specimens have a ground color of reddish brown, and the greater number of the scales black-edged or black-tipped ; backward they have irregular spots of dark including one to several scales ; and the belly appears to have been a brick-red in life. The larger ones have transverse blotches of brown under the tail, and numerous white-edged scales similar to those of *Liophis cobella*. Some have vertical bands or blotches of brown anteriorly on the flanks ; farther back these meet on the vertebral line and become transverse bands.

Very young ones are ashy or grayish, with brown punctulations; the head and posterior margins of ventrals and subcaudals are darker; a white-edged brown band passes from the nostrils, spreading to include the eye, to the eighth labial; and chin, throat and lips are mottled with brownish.

Half-grown are less uniform, and more brown; they have scattered white-bordered scales in the anterior half of the length, faint indications of transverse dorsal bands of brown, and an indefinitely margined brown band across the head from the hinder edges of the orbits.

BUFO MARINUS Linn.; Schneid.

A single quite young individual appears in the collection. Compared with many others of the same size from Jamaica, it is rather more smooth and of lighter color. The Jamaican examples are roughened with sharp points and in general color are dark brown; the spots on the ventral surface are numerous and dark. On the Cayman specimen the color is ashy or grayish, and the spots beneath have a faded olivaceous tint. Spots, glands and warts have similar positions and shapes in both cases.

Nothing can be said of the place whence this species came, it is so generally distributed among the West Indies, from Jamaica southward, and along the coasts of South and Central America.

HYLA SEPTENTRIONALIS Tschudi; Blgr.

In very large specimens the habit is massive and much like that of the toad; the skin is glandular, and, in some, covered with large smooth warts. On young ones the skin is quite smooth. A male, less than one-fourth the size of the females, has a blackish rugosity on the inner side of the first finger.

The color varies from grayish olive to brown, irregularly marked with darker on the back. Ventral surface whitish, with or without spots or cloudings of dark anteriorly. Limbs with transverse bands of brown. In the folds in front of the shoulder the brown takes the form of narrow vertical lines. Behind the thighs and along the flanks there are irregular small spots or reticulations of brown. On small ones there is a white band on the posterior half of the upper lip, a brown one behind each eye through the tympanum toward the shoulder, and a transverse band, concave forward, across the head between the eyes.

No differences are noted between these and others from Cuba.

Mr. Richardson states that the natives reported a crocodile in the swamps. This might be expected from the presence of two species on Cuba, one of which appears also on Jamaica and San Domingo. In completing the list of the Grand Cayman reptiles it will, no doubt, be necessary to add the names of the marine turtles, *Thalassochelys cephalo*, *Chelonia mydas*, *Eretmochelys imbricata*, and *Dermatochelys coriacea*.